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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/497,993	02/04/2000	Bradley Paul Barber	AGERE3.0-064	8152

49472 7590 11/20/2006

AGERE
LERNER, DAVID et al.
600 SOUTH AVENUE WEST
WESTFIELD, NJ 07090

EXAMINER	
TUGBANG, ANTHONY D	
ART UNIT	**PAPER NUMBER**
3729	

DATE MAILED: 11/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/497,993	BARBER ET AL.	
	Examiner	Art Unit	
	A. Dexter Tugbang	3729	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 December 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,10-13,15,16,30 and 32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,10-13,15,16,30 and 32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The Petition filed on December 19, 2005 has been granted per the decision mailed on February 16, 2006. Accordingly, the response filed on December 19, 2005 has made of record and entered.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

3. Claims 1, 13, 15, 16, 30 and 32 rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Fujii et al 5,868,948, the Applicants Admitted Prior Art, referred to hereinafter as the AAPA, and EerNisse et al 5,022,130.

Regarding Claim(s) 1 and 13, Fujii discloses a method of producing a piezoelectric device comprising: depositing a first metal film 102 by sputtering directly on a substrate 101 (see Fig. 2); patterning the first metal film by achieving a certain thickness (see col. 4, lines 24-33); depositing a piezoelectric material on the first metal film to form a single continuous piezoelectric layer 103; depositing a second metal film 104 by sputtering on the single piezoelectric layer; patterning the second metal film to achieve a degree of thickness; and removing some of the piezoelectric material from the single piezoelectric layer not involved in signal transmission by a selective etching process after patterning of the second metal (see col. 4, lines 58-61).

It is noted that the piezoelectric material that is removed is considered to be "not involved in signal transmission" because the removed material is not part of the finished product or is not part of the operation of the device. Furthermore, the remaining piezoelectric material on the substrate is read as the "un-etched regions" and this remaining piezoelectric material is inherently limited in lateral propagation losses or lateral modes as compared to operation of the device if some of the piezoelectric material had not been removed.

Regarding Claim(s) 15, Fujii shows an example where some of the material of the substrate surface 1205 is removed by selective etching (see Fig. 12).

Regarding Claim(s) 16, Fujii shows at the bottom of Figure 2 that a "void" is formed on either side of the remaining piezoelectric material 103 and that this void is inherently back filled with a different material of at least air.

Regarding Claim(s) 30 and 32, the piezoelectric material of Fujii is not considered to be patterned until some of the piezoelectric material is removed.

Fujii does not mention that the device being manufactured is an "acoustic resonator device".

The AAPA (in Fig. 1) shows a similar structure of a single continuous piezoelectric layer between first and second metal films on a substrate and that this structure is utilized in a piezoelectric device of an acoustic resonator. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Fujii by producing an acoustic resonator device, as taught by the AAPA, since each produce art recognized equivalent structures of a piezoelectric layer between first and second metal films on a substrate.

If applicant(s) do not believe that removal of some of the piezoelectric material of Fujii inherently limits lateral propagation losses or lateral modes in the un-etched regions of the device, then EerNisse shows that removal of some of the piezoelectric material in a device limits and specifically controls propagation losses or lateral modes in the remaining or un-etched piezoelectric material by achieving a certain degree of vibration, i.e. propagation losses, to obtain a resonant frequency of the device (see col. 7, lines 20-53).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Fujii by limiting propagation losses and lateral modes in the un-etched regions of the device, as taught by EerNisse, to positively achieve a desired resonant frequency.

4. Claims 10 through 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art above, as applied to claim 1 above, and further in view of Zdeblick et al 5,129,132.

Fujii, as modified by the AAPA and EerNisse, discloses the claimed manufacturing method as previously discussed. The modified Fujii method does not teach the material of ZnO for the piezoelectric material (as required by Claim 10), lithographic patterning (as required by Claim 11), and that the substrate is formed from silicon.

Zdeblick shows a manufacturing process that includes a similar structure of having a piezoelectric layer between first and second metal films where the metal films are patterned specifically by lithographic patterning (see col. 8, lines 18-21), that the piezoelectric material can be formed of ZnO (see col. 7, lines 28-30), and that the substrate can be made of silicon (see col. 6, lines 62-64). The benefits of the above manufacturing process allow control of the vibration, i.e. lateral propagation and lateral modes, of the device (see col. 3, lines 49-53).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Fujii by utilizing the materials and manufacturing process of Zdeblick, to positively control the lateral propagation and modes of the device.

Response to Arguments

5. The applicant(s) arguments filed on December 19, 2005 have been fully considered, but have not been deemed to be found as persuasive.

In regards to the merits of Fujii et al, the applicant(s) argue that Fujii does not teach any piezoelectric material. The applicant(s) believe that the dielectric material of layer 103 in Fujii is not piezoelectric.

The examiner most respectfully disagrees. The dielectric material (e.g. 103) of Fujii is a known piezoelectric material that is inherently piezoelectric. There are at least three factors as to why this dielectric material (e.g. 103) of Fujii et al is piezoelectric and the examiner cites the following extrinsic evidence to support the examiner's position of inherency.

1) Fujii et al clearly suggests that the dielectric material 103 is utilized as pyroelectric material, or alternatively as a piezoelectric material, within pyroelectric devices or piezoelectric devices, respectively (col. 1, lines 6-10 and lines 55-60).

2) The composition of layer 103 (e.g. $Pb_{0.9}La_{0.1}Ti_{0.975}O_3$) is a ferroelectric material (col. 1, lines 21-23 of Fujii) that includes solutions of lead titanate, or more specifically, a ferroelectric ceramic material that exhibits piezoelectric properties. The examiner cites Tsunooka et al (U. S. Patent 4,675,123) to show that ferroelectric ceramic materials made up of lead titanate directly exhibit piezoelectric properties (col. 5, lines 28-42 and col. 6, lines 28-35)

and that a composition that contains a higher amount of ferroelectric ceramic material, e.g. lead titanate, will exhibit higher amounts of piezoelectric properties.

3) To understand what constitutes whether a material is piezoelectric or not is defined by the USPTO Manual of Classification[1]. Class 252, Subclass 62.9 recites the following definition.

PIEZOELECTRIC:

This subclass is indented under the class definition. Compositions specialized and designed for use as piezoelectric materials and processes of making said compositions.

(1) Note. *A piezoelectric material, for the purpose of this definition, is defined as a material which exhibits an electrostatic polarization when subjected to mechanical stress or which exhibits a mechanical stress, tending to produce a deflection when subjected to electric stress.*

(2) Note. Compositions, per se, are classified in this subclass when, by either disclosure or claim, the composition is piezoelectric. (emphasis added)

During operation, the ferroelectric ceramic material (e.g. 103) of Fujii will be subjected to electrostatic polarization by virtue of the voltage and current placed on the ferroelectric ceramic material through electrodes (e.g. 102, 104). Moreover, any of the dielectric devices (e.g. volatile memory tips, microsensors, actuators, etc.) of Fujii are each devices that when subjected to mechanical stress, exhibit a mechanical stress tending to produce deflections during operation, or when the current and voltage is applied.

Additionally, Tusnooka explicitly states that the very composition (e.g. lead titanate) that Fujii utilizes as layer 103 meets the above definition because the patent of Tusnooka was originally classified in Class 252, Subclass 62.9. Tusnooka is just one example that the composition of layer 103 of Fujii et al is piezoelectric. There are many other patents that cite lead titanate (e.g. $Pb_{0.9}La_{0.1}Ti_{0.975}O_3$) as a piezoelectric material.

So at least for the three factors as noted above, $Pb_{0.9}La_{0.1}Ti_{0.975}O_3$ is piezoelectric, and thus, Fujii meets the limitations of the claims of a "piezoelectric material".

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The features of an acoustic resonator were relied upon in the AAPA. However with respect to EerNisse, the examiner's position is that the quartz crystal resonator of Eernisse is an acoustic resonator, because it exhibits the very same acoustic, or piezoelectric, properties of the AAPA and Fujii et al. Also, the features of depositing and removing the piezoelectric material was relied upon in Fujii with EerNisse mainly cited to show the resultant properties of what occurs when piezoelectric material is removed, i.e. the propagation of energy in lateral modes.

Accordingly, the examiner maintains that the combination of references is proper for all of the reasons set forth above.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

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[1] See Website: http://www.uspto.gov/web/patents/classification/

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Dexter Tugbang whose telephone number is 571-272-4570. The examiner can normally be reached on Monday - Friday 7:30 am - 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 571-272-4690. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A. Dexter Tugbang
Primary Examiner
Art Unit 3729

November 14, 2006